

V. "Propagation of Magnetisation of Iron as affected by the Electric Currents in the Iron." By J. HOPKINSON, F.R.S., and E. WILSON. Received May 17, 1894.

(Abstract.)

Consider a solid, cylindrical electromagnet, it is well known that, in reversing the magnetising current, the induction does not instantly reverse, but a certain time elapses before it again attains its full value, that it reverses at a later time at the centre of the core than near its surface, and that the delay in reversal near the centre is due to the electric currents induced in the iron. The object of the present paper is to investigate these effects.

The magnet experimented upon had a diameter of 4 inches, and formed a closed magnetic circuit. Through a part of its length the cylinder of 4 inches diameter was formed of an iron core surrounded by two concentric, closely fitting tubes. Exploring coils of fine copper wire were bedded in the iron between the surfaces of the tubes. The currents induced in these exploring coils were observed when the current in the main coil of the magnet was reversed. These currents in some cases last for over half a minute.

Inferences can be drawn from these results as to the behaviour of other diameters than 4 inches. Comparing two cylinders of different diameters, similar events occur, but at times proportional to the squares of the diameters of the cylinders. From this consideration and the experiments, a judgment is formed as to the effects of local currents in the cores of transformers and of the armatures of dynamo machines.

VI. "On Rapid Variations of Atmospheric Temperature, especially during *Föhn*, and the Methods of observing them." By J. Y. BUCHANAN, F.R.S. Received May 29, 1894.

The variation of the temperature of the air in the course of a day is a matter of familiar observation. It depends in the first instance on the relative positions of the locality and the sun. The temperature is generally highest a short time after the sun has attained its greatest altitude above the horizon, and it is lowest some time after it has attained its greatest depression below the horizon. Observations made at regular intervals over the twenty-four hours show a more or less regular rise of temperature during the early part of the day and a similar fall of temperature during the latter part of the day and the evening. When the interval between the observations is